



# IPTV Primer

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IRT Workgroup

## What Is IPTV?



- IPTV is the delivery of video and audio programming via Internet Protocol (IP) over a broadband network
- IPTV can run on a converged network along side other interactive services (i.e. High-Speed Internet, Voice-over-IP, In-room Controls, etc.)
- Transports Standard-Definition (SD) and High-Definition (HD) digital video, supporting a wide range of video quality
- Displayed on a TV / Monitor utilizing an IP decoder (STB, slide-in card, built-in, etc.)

## What are the Advantages?



- Simplifies and can reduce total cost of infrastructure through convergence of voice, data, audio/video and other network applications.
- Infrastructure can support all formats of digital audio and video
- IP infrastructure can support an unlimited number of channels
- Common infrastructure will lead to more effective support by IT staff
- Easier to monitor and manage distribution network remotely
- Switched video networks only utilize bandwidth for currently watched programming
- IP protocol affords easier integration with disparate services and applications
- Economies of scale for Ethernet devices versus broadband services
- One-to-one two way communication

## What are the Disadvantages?



- Redundancy can be expensive for active networks
- IPTV is less mature than traditional video delivery methods
- Interoperability and stability of IPTV still evolving
- Requires complex IP Network and Quality of Service (QOS)
- May require costly encoding of various formats (H.264, MPEG-2, etc.)

## How Does It Work?



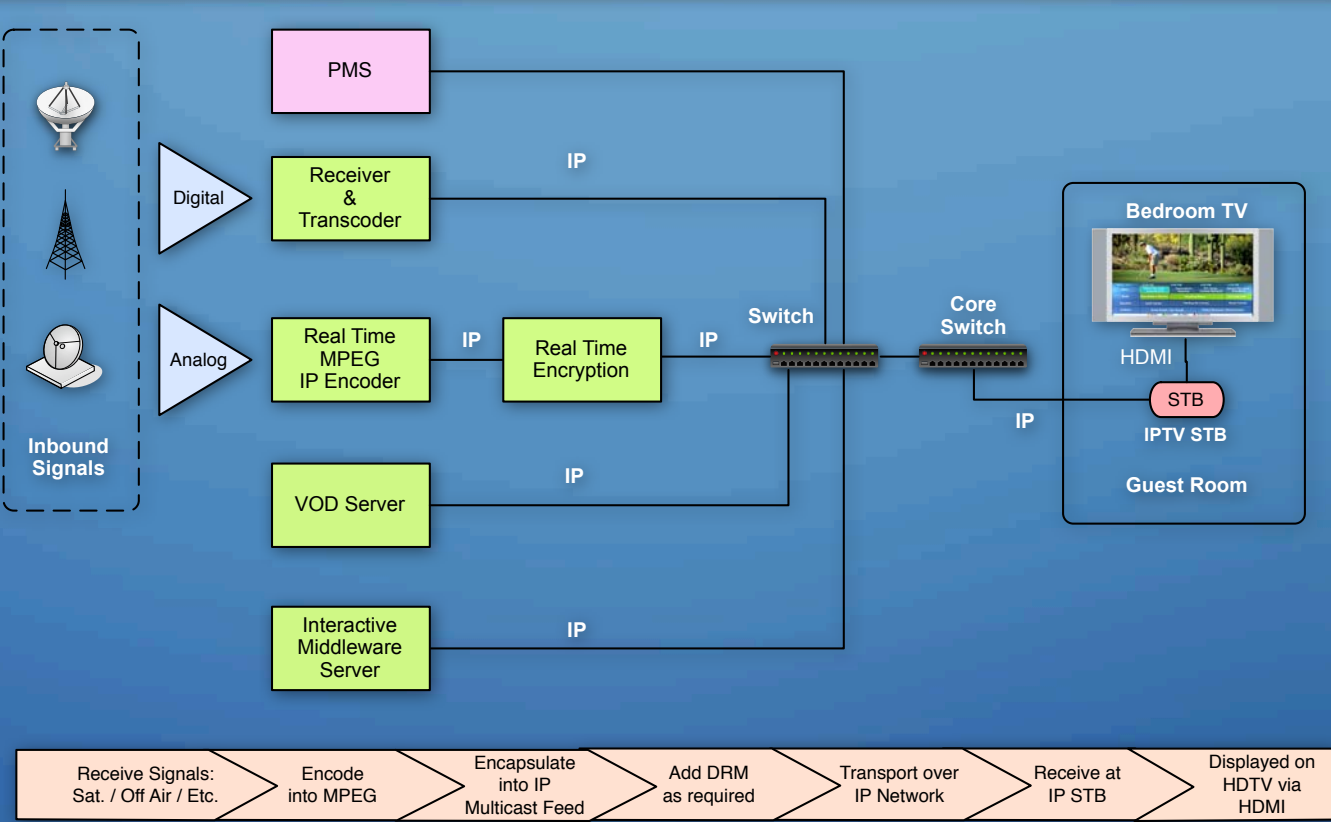
- Video and audio content is digitally encoded (i.e. MPEG-2 or MPEG-4)
- These streams are re-formatted and encapsulated for transmission using Internet Protocol (IP) for delivery over a broadband network
- Security or Digital Rights Management (DRM) is added, if required
- The IP streams are streamed to a decoder (i.e. set-top box, slide-in card, etc.) to decode and display the signal
- Quality of Service (QOS) is utilized on the network to prioritize data delivery and one type of data service over another (i.e. audio and video takes priority over Internet, etc.)

## How Does It Work?



- ⦿ When the guest selects a channel to watch, the IPTV decoder tunes to the channel's multicast IP address
- ⦿ IPTV can deliver live television, as well as on-demand pre-recorded content
- ⦿ IPTV streams can be encrypted or unencrypted ('in the clear') based upon the content providers' requirements.
- ⦿ Interactive content can be served from the head-end or generated locally on a set-top box, slide-in card or through an embedded application environment (i.e. GEM).

# How Does It Work?



Receive Signals: Sat. / Off Air / Etc. → Encode into MPEG → Encapsulate into IP Multicast Feed → Add DRM as required → Transport over IP Network → Receive at IP STB → Displayed on HDTV via HDMI

## What Do I Need?



### CLIENT

- ⦿ Each television needs an IP-based decoder. This may come from many forms, i.e. set-top box, slide-in card, built-in, etc.
- ⦿ Decoder should be able to decode 720p & 1080i (1080p optional).
- ⦿ Decoder should support HDCP from decoder to television, typically over HDMI cable
- ⦿ Decoder should support multiple frame rates (23.98, 24, 25, 29.97, 30)
- ⦿ Decoder needs to support the bit rates of all inbound signals (typically 1.5 - 19.3Mbs depending on compression used and quality desired).

## What Do I Need?



### NETWORK

- ⦿ Network design takes bandwidth requirements into account
- ⦿ Robust and scalable IP Network that supports the number of audio and video channels being streamed over network
- ⦿ Confirm minimum & maximum bandwidth requirements between switch and set-top boxes
- ⦿ Router and switches need to support IP multicast snooping and data-driven IGMP
- ⦿ Typically IPTV requires IGMP, which only allows the current data that is being requested to feed the decoder.
- ⦿ Network requires Quality of Service (QOS) to ensure that high priority data is delivered before lower priority data (i.e. voice before video, video before data, etc.)
- ⦿ Requires very low network packet loss

## Digital Rights Management - DRM



- ⦿ The majority of HD programming services require an approved layer of security from origination to the display.
- ⦿ There are many popular encryption technologies, including but not limited to:
  - Pro:Idiom™
  - Verimatrix Video Content Authority System (VCAS™)
  - Widevine Cypher®
  - Secure Media Encryptonite ONE™
- ⦿ Copy protection may also be required (i.e. Macrovision, etc.)
- ⦿ Encryption may be required between the set-top box and the monitor (i.e. HDCP, DTCP, etc.)
- ⦿ Some content providers may require 'Watermarking' or similar technology, which embeds a hidden identification into the video image

## Questions To Ask Providers



- What are the service provider's network infrastructure requirements?
- Who is responsible for ownership, monitoring and servicing each component?
- Who is your linear content provider and what channels are available and in which format?
- What is the video delivery format (MPEG-2 or MPEG-4 or both)?
- What audio only formats are supported for audio & music channels (mp3, wma, mpeg, etc.)?
- How many HD channels are available today and by end-of-year?
- How does the programming get to the hotel (i.e. satellite, fiber, cable, etc.)?
- How much bandwidth is required for audio and video services?
- What is the channel changing time?
- What TV's are compatible with their service?
- Is there a set-top box, slide-in card, etc. required?